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LITERATURE.

Experimental Psychology. A Manual of Laboratory Practice. Volume I, Qualitative Experiments, Part I, Student's Manual; Part II, Instructor's Manual, by EDWARD BRADFORD TITCHENER. The Macmillan Company, New York, 1901. Part I, pp. xviii+214; Part II, pp. xxxiii+456. Price \$1.60; \$2.50.

In these volumes Mr. Titchener has accomplished an extremely difficult task with extraordinary success. The interests of solid, scholarly instruction in experimental psychology have been rendered an invaluable service, and it does not seem too sanguine to predict a radical alteration in the academic status of this branch of science, as an outcome, direct or indirect, of Mr. Titchener's work. It is not implied by this statement that experimental psychology is to come to its own instant in the matter of academic dignity and scientific repute. It will come to that just as speedily as its deserts really warrant. Nor is it intended to predict, much less to advise, a slavish adherence to Mr. Titchener's views and modes of procedure. But the lack up to this time of even approximate uniformity in laboratory instruction, and the very inadequate systematization of the elementary phases of such work, have co-operated on the one hand to detract from its disciplinary prestige, and on the other hand to leave upon the mind of the average student an altogether undesirable impression of incoherent discontinuity. The present Manuals furnish precisely the systematized focus which is needed to bring together the divergent practices of different instructors and different institutions. Whether the books are adopted outright or not in laboratory work, they offer a perfectly definite standard of comparison, which will unquestionably do away with a deal of needless misunderstanding; and their methods are so clearly superior to those in vogue in many places, that they must infallibly secure recognition. Moreover, it seems wholly impossible for a student to work conscientiously through such a course, without gaining the same kind of mental discipline, which supposedly accrues from a substantial laboratory course in other lines of science. Nor is it conceivable that he should come from such a drill without a vivid sense of the large and rapidly growing body of demonstrable facts and principles which the experimental psychology of to-day has to offer. This need not be at the expense of a just apprehension of the extensive region still open to speculation and controversial opinionating and the more alluring domains as yet wholly unexplored. But the emphasis will fall where it ought to fall with a beginner, *i. e.*, on the side of established achievement, upon which fresh achievement must be founded.

Before proceeding to examine the construction of the work in its details, it is desirable to discuss briefly the principle upon which volume I is distinguished from volume II. [Volume II is in course of preparation.] This principle involves the severance of qualitative from quantitative experimentation. How far is such a severance possible, and granting its possibility, how far is it judicious? One need not be profoundly versed in the Hegelian logic to appreciate the impossibility of any absolute separation of qualitative and quantita-

tive analyses. Nevertheless, chemistry at least has found the distinction of large practical utility and there is at the outset, therefore, some presumptive evidence from analogy in favor of the incorporation into psychological methods of this differentiation. As applied to psychology the distinction clearly involves the mere question of the specific focus of interest. Are you concerned primarily with the problem of the constitution of a mental complex and its analysis into the several component factors, then your method is essentially qualitative. You cannot in such a method disregard quantitative elements. Indeed, you must employ them as parts of your technique. But your interest is not centered upon them as the end of your inquiry. Conversely, a quantitative analysis must involve qualitative differences brought out in the course of investigation, but in this case they fall into the background as of secondary importance.

Whether in actual practice it is not economical of time and effort to work over a given field, *e. g.*, that of dermal sensations, by intermingling quantitative and qualitative experiments, rather than to follow out the complete series of qualitative observations first, is a matter which can be decided only in the light of experience and the exigencies of local conditions. Numerous considerations, both pro and con, will at once suggest themselves. But despite Mr. Titchener's obvious opinion, there seems to be no reason why, after the appearance of the *Manual on quantitative work*, an instructor should not combine the two in any way he chooses. It may be, that when this second volume appears, the author will assign quantitative investigations a position in the hierarchy of psychological methods, which will still further fortify the wisdom of his division.

It has been a source of the utmost gratification to the reviewer to note the author's repeated emphasis upon the fundamental importance of qualitative analyses. The present writer has long felt that the somewhat morbid ambition of many of our most energetic experimentalists to present the facts of psychology in the purely quantitative formulæ of physics and mathematics was retrogressive and harmful in its influence. It is not that quantitative considerations have not an important place in experimental methods. On the contrary, this is stoutly maintained. But they must always be ultimately subservient to the interests of qualitative analyses, otherwise we have no longer psychology, the science which investigates the structure and function of mind, but mathematics—or physics—indulging herself in a new field. When a student, who is temperamentally a physicist or a mathematician, strays into psychology, it should cause no surprise to find his perspective somewhat distorted, much less to find him at times confusing means and end. But it certainly does furnish adequate ground for frequent and, if necessary, vociferous insistence on the proper position of quantitative methods.

In the general form and construction of his book Mr. Titchener has consulted the best precedents of the laboratory manuals in other sciences. The student's part contains in the case of each experiment a succinct and lucid statement of the purpose of the experiment, a list of the materials necessary, with explicit dimensions, and definite instructions for the mode of procedure and the tabulation of results. Suggestive questions at the end of the directions invite the student to emphasize the most significant portions of his observations, to connect them with that which he has previously learned, and to go on beyond the limits of the original problem to further questions of cognate character. Cuts, diagrams and illustrative tables are liberally provided.

In the older sciences the question might be raised concerning the necessity for an instructor's manual. But in the present condition of

experimental psychology the issue is hardly open and, if the contrary opinion is held, a glance at Mr. Titchener's Part II should disabuse one of the impression.

The introduction contains an excellent discussion of general methodological subjects, including a fresh pronunciamento upon Mr. Titchener's favorite topic, the structural-functional psychology question. The author's honest and enthusiastic partisanship upon this matter is considerably in evidence in both parts of the Manual. The bibliographical machinery is one of the most striking features of the volume. It represents enormous labor and exercise of the nicest judgment. So far as the reviewer feels competent to judge, the task has been executed with the utmost conscientiousness and with admirable sanity. In many particulars it is distinctly the most useful bibliography on these subjects now extant. Each chapter is opened by a brief critical exposition of the facts and principles which are to be considered. These paragraphs are extremely important, not only by virtue of their intrinsic value as clear formulations of complex situations, but also as furnishing the instructor in large measure the point of view from which the author has made his selection of experiments and ordered the procedure involved in them. The commoner forms of apparatus are described and often illustrated by cuts. Alternative forms of apparatus are compared and in many instances prices are quoted as well as makers. The directions for the individual experiments contain suggestions for the avoidance of common difficulties, and answers, or indications of the answers, to questions suggested in the student's part of the Manual. Attention is also called to different forms of many of the experiments and emphasis is laid upon such features as have been of special historical importance, whether from a controversial point of view or otherwise. The tabulated examples of typical student observations will be found extremely valuable and suggestive.

The arrangement of topics resembles closely that followed in the author's *Outline of Psychology*. Experiments upon the various forms of sensation furnish an introduction to the analysis of affection, perception, memory, etc. The instructor is advised against permitting all of his class to work upon the same topic at one time. There are certain indisputable advantages belonging to this method, but the reviewer's experience leads him to question the universal wisdom of this policy. The conditions of the curriculum in many institutions must—to mention but a single point—frequently necessitate the combining of laboratory work with somewhat detailed lecture work. Indeed, something may be said for this as intrinsically the preferable plan. In any case, where this scheme is actually in operation, it becomes almost essential to keep the members of the class upon closely related, if not identical, problems. Otherwise we involve either a waste of the instructor's time in needless repetition, or a loss of maximum attainment on the part of the student, through injudicious postponement of critical and exegetical lectures. The situation which Mr. Titchener has in mind is not exposed to this criticism, because it contemplates an extended and thorough introductory course of systematic lectures. Moreover, he explicitly calls attention to the possibility of making the experiments articulate, as closely or as loosely as one chooses, with systematic lectures and discussions. But it is certainly problematic, whether the attempt to keep the members of a class engaged upon different subjects does not carry with it as a necessary consequence the practical abandonment of general lectures paralleling the laboratory work.

In the selection of the thirty-seven experiments, which constitute the course—designed to occupy a half year—Mr. Titchener has put

his judgment and experience to the severest test. He will not look for unqualified endorsement of this part of his work from his fellow craftsmen, for it is altogether improbable that any two experimentalists would agree upon an identical series. He will have scored a notable success if he escape the charges of omitting some essential features and incorporating some ambiguous, inaccurate experimentation. Although the reviewer proposes in a moment to have his little fling at Mr. Titchener, he cannot conscientiously lay either of the above complaints at his door. Taken as a whole the experiments serve admirably to convey not only a substantial knowledge of the basal facts concerning the several processes of fundamental psychological import, but also a trustworthy impression of the scope and technique of the more significant experimental methods employed for the qualitative analysis of consciousness.

As suggestive of the variants which would commend themselves to the reviewer, the following may be mentioned. One or two experiments upon the æsthetic preferences among simple line figures might be added. These experiments are not difficult to arrange in a manner sufficiently accurate greatly to assist the analysis of elementary æsthetic processes. They can readily be made to furnish a highly valuable basis of a concrete kind for an intelligent apprehension of the æsthetic categories of symmetry, proportion, etc. In view of the constant necessity for precautions against fatigue, it seems judicious to have at least one experiment in which the progressive stages of mental fatigue are themselves the subject of observation. Certain of Binet's computation methods are readily available for this purpose and they are at least sufficiently representative to be of real value in such a course. More important, perhaps, than either of these experiments is the experiment involving the comparison of visual and tactual space. Space is so conspicuously unhomogeneous in its psychological characteristics, and our comparative judgments are so evidently developed achievements involving complex experiences, that this experiment is of great significance as a ready and conclusive mode of furnishing relatively precise impressions of certain of the sensory interrelations concerned. The extremely easy test upon the so-called size-weight illusion possesses a somewhat similar value. It is of course understood that, alongside of considerations of intrinsic value, one has in selecting one's experiments to take account of available time. The above suggestions may serve to illustrate, however, the comment made a few lines above, that every laboratory man would have his own pets, which he would in some cases possibly prefer to Mr. Titchener's recommendations.

The one point where the reviewer feels disposed to take serious issue with Mr. Titchener concerns his treatment of the physiological expressions of the affective processes. This is an issue of fact and Mr. Titchener undoubtedly is convinced of the reliability of his observations. Certainly he couches his directions and specifications so that—to mention only a single instance—one must gather that one has made a faulty experiment, if one fails to secure dilatation of the blood vessels of the hand and arm, when supposedly experiencing pleasure. On this subject the reviewer is undoubtedly partisan and therefore a critic open to just suspicion. But he feels that the body of evidence presented in recent years by the laboratories of the Sorbonne and the University of Chicago, without mentioning many other trustworthy observations, is sufficient to warrant a more conservative attitude than the one adopted. In the case of the theories of reaction, for example, Mr. Titchener, who has in this field been a vigorous protagonist, makes a presentation which is altogether unprejudicial to the interests of the

different views maintained by experimentalists. In the present case of the affective processes our criticism does not touch his right of adherence to the older doctrine, but rather the mode of presentation, which in our opinion is distinctly indicative of finality, where finality is quite open to question. With Mr. Titchener's view of the relation of affection to attention and the conspicuous place which attention occupies in the experimentation above referred to, the nexus between the older and the newer formulations is by no means difficult to establish. We regret, therefore, that the author has not phrased this part of his work more flexibly. In a similar manner the reviewer is quite confident that the statements based on the dynamometrical experiments are too extreme. A full discussion of these points is, however, obviously out of place here.

Despite the conventional unpopularity of comparison, Mr. Titchener's book will inevitably be compared with Mr. Sanford's Manual, which has hitherto occupied the field alone. A word of comment on the two books may, therefore, be permitted. In the reviewer's opinion the books so far from becoming competitors are likely to be felt as indispensable supplements to one another. There can be no possible question that Mr. Titchener's volumes supply a long felt need, which Mr. Sanford's book largely failed to satisfy. We have already pointed out some of these particulars. But Mr. Sanford's book has been of invaluable assistance to every laboratory in this country, and its wealth of experiments and its convenient bibliographical materials will retain for it a necessary place in every laboratory course. With two such books at his side it must be an ill-trained and incompetent instructor who cannot make his introductory experimental work effective and interesting.

Mr. Titchener's publishers have given his books a most attractive dress. The typographical work is beyond criticism. Carefully prepared indices, lists of apparatus, etc., complete the highly efficient system of devices for rendering the material of the volumes easily accessible.

JAMES ROWLAND ANGELL.

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The origins of Art—a psychological and sociological inquiry, by YRJÖ HIRN. Macmillan & Co., 1900.

In this carefully written volume of 300 pages Prof. Hirn has given us, not only an able discussion of most of the current questions of æsthetic theory, but has so balanced certain features of explanation that the result becomes original if not completely just. Art is represented as arising from a feeling-state or emotion, in which is contained the desire not only for exteriorization but for social transmission. In this latter process secondary qualities arise which aid in securing the transmission and perpetuation of the original feeling-state. These have been derived from the media, which, moreover, were originally called into being by utilitarian non-æsthetic needs. These media are not merely to be regarded as the material, the clay, the gesture, the mark, the sound, the bright or attractive object, but the purposes already in existence before the art-impulse uses them for its higher needs. These are also origins, among which Prof. Hirn discusses in detail (1) the need for conveying information, which in an art form is retained as lucidity; (2) the need for erotic propitiation, or more generally for obtaining favor, recognized in the sensuous and attractive forms of art; (3) the need of co-ordination in work or war, retained as stimulation or excitement; and (4) the faith in magic, giving us the most characteristic quality of imagination.

As will be seen, this is a scheme which fits in most admirably to the